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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,351	06/20/2007	Gerard Hillion	PET-2271	8163

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Millen White Zelano & Branigan
Suite 1400
2200 Clarendon Boulevard
Arlington, VA 22201

EXAMINER	
PO, MING CHEUNG	
ART UNIT	PAPER NUMBER
1771	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,351	HILLION ET AL.	
	Examiner	Art Unit	
	MING CHEUNG PO	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,9-11,15-19,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,9-11,15-19,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Request for Continued Examination

1. This is the response to request for continued examination filed on 10/05/010 for application 10/590351.

2. Claims 1, 5, 9-11, 15-19 and 21-22 are currently pending and have been fully considered. Claims 2-4, 6-8, 12-14, and 20 have been cancelled. Claim 22 has been added.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 5, 15-18 and 22 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 7151187 in view of U.S. Patent App 10/329,322. U.S. Patent No. 7151187 teaches a process for producing esters of fatty acid and glycerin using a heterogeneous catalyst that are substantially similar to the catalyst. U. S patent No. 7151187 differs in that it does not teach further processing the glycerol to form acetal. However, U.S. Patent App 10/329,322 teaches a process that involves transesterification of triglycerides and then separating the glycerin. The glycerin is then acetalized and mixed with the esters formed form the transesterification to form a biodiesel.

5. Claims 1, 5, 15-18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of U.S. Patent No. 7592470 in view of U.S. Patent App 10/329,322. U.S. Patent No. 7592470 teaches a process for producing esters of fatty acid and glycerin using a heterogeneous catalyst that are substantially similar to the catalyst. U. S patent No. 7592470 differs in that it does not

teach further processing the glycerol to form acetal. However, U.S. Patent App 10/329,322 teaches a process that involves transesterification of triglycerides and then separating the glycerin. The glycerin is then acetalized and mixed with the esters formed form the transesterification to form a biodiesel.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Claim 21 teaches that the glycerol is etherified with isobutene. However, claim 21 is dependent on claim 16 which teaches that the glycerol has already been in an acetalization and reacted to form a glycerol acetal. It is unclear whether the glycerol is formed into ethers or acetals or both.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over BRADIN (U.S 5,578,090) in view of English translation of HILLION (FR 2,794,768).

Regarding claims 1-6 and 12, BRADIN teaches an alternate fuel composition that includes a fuel additive composition. The fuel additive composition is prepared by

esterifying the free fatty acids and etherifying glycerol with one or more olefins in the presence of an acid catalyst. In lines 22-28 of column 3, BRAIDN teaches that the esterification and etherification reactors may be run in separate reactors. BRADIN teaches in lines 34-41 of column 3 that the fatty acid alkyl esters and the glyceryl ethers can be prepared by any means known to those of skill in the art. Means for preparing fatty acid alkyl esters include **transesterifying** triglycerides with **alcohols** in the presence of an **acid or base catalyst**. The alcohol is taught in lines 16-20 of column 4 to be any **C_{1-6} straight, branched, or cyclic alcohol, but preferably ethanol**. The glyceryl ethers are prepared by reacting glycerol with an alkyl halide in the presence of a base of an olefin or an alcohol in the presence of an acid catalyst. The olefin is taught in lines 62-67 of column 4 and lines 1-6 of column 5 to be preferably an unsaturated straight, branched, or cyclic hydrocarbon of C_2 to C_{10}.

BRADIN does not seem to explicitly teach a heterogeneous catalyst.

However, HILLION teaches in the first paragraph of the description a process for the manufacture of a fatty acid ester by the use of a **heterogeneous catalyst chosen from zinc oxide, a mixture of zinc oxide and alumina or a zinc aluminate consistent with the formula: $ZnAl_2O4$, xZnO, y AL_2O_3 (x, y= 0-2),** with a 1-18C mono-alcohol.

It would be obvious to one of ordinary skill in the art to use the catalyst that HILLION as the transesterification catalyst in the process that BRADIN teaches.

The motivation to do so would be for the manufacture of a fatty acid ester to a high state of purity.

BRADIN does not seem to teach a purification step consisting of a vacuum treatment to remove the ethanol.

However, it would be obvious to one of ordinary skill in the art to use ethanol with the heterogeneous catalyst that HILLION teaches for the transesterification of fatty acids and an olefin with an acid catalyst for the etherification step.

The motivation to do so can be found in lines 28-31 of column 4 of BRADIN. BRADIN teaches that using olefins rather than alcohol would be less expensive.

A vacuum treatment to an alcohol is well known in the art and it would be obvious for one of ordinary skill in the art to use vacuum treatment to separate the ethanol in the transesterification step from the glycerol before etherification.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 11, BRADIN teaches in lines 62-67 of column 4 that **isobutylene (isobutene)** may be used as the olefin in the etherification reaction.

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over BRADIN (U.S 5,578,090) in view of English translation of HILLION (FR 2794768) and further in view of BOURNAY (U.S. 6,878,837).

The above discussion of BRADIN in view of HILLION is incorporated herein by reference.

Modified BRADIN does not seem to explicitly teach the conditions of the reactor.

However, BOURNAY teaches that alkyl esters of fatty acids and high purity

glycerin can be produced by using a process comprising a set of transesterification reactions between a vegetable or animal oil and an aliphatic monoalcohol employing a heterogeneous catalyst. BORUNARY teaches the conditions in lines 8-65 of column 4: upflow reactor; $30x10^5$ to 80 $x10^5$ Pa; 453 to 493 K; HSV of 1.2 h^{-1} to 0.1 h^{-1}. At least 90% by weight of the oil is converted. More than one reactors may be used. The mixture after reaction undergoes a depressurization phase. In lines 1-6 of column 5, the liquid is decanted in a decanter drum.

It would be obvious to one of ordinary skill in the art to apply the conditions that BORUNAY teaches with a reasonable expectation of success given that both BRADIN and BOURNAY are directed towards the production of esters from fatty acids.

The motivation to use the method that BOURNAY teaches can be found in lines 49-59 of column 2 in BOURNAY. BOURNAY teaches that high purity of glycerin can be formed.

Although BOURNAY does not seem to explicitly teach the ranges claimed in the present invention it would be obvious to one of ordinary skill in the art since it has been held that where the general conditions are known, optimization or workable ranges involve only routine experimentation to one of ordinary skill in the art. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention.

11. Claims 1 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over DELGADO PUCHE (USPGPUB 2003/0167681) in view of English translation of HILLION (FR 2794768).

Regarding claims 1 and 16, DELGADO PUCHE teaches a procedure to produce biodiesel fuels with improved properties at low temperature by **transesterify triglycerides with an alcohol, preferentially methanol or ethanol, in the presence of acid or base catalysts to produce mixtures of methyl or ethyl esters of fatty acids and crude glycerine; isolate the crude glycerin obtained as a secondary product; and then to make all or part of the glycerin react with aldehydes, ketones, to obtain the corresponding acetals.**

DELGADO PUCHE does not seem to explicitly teach a heterogeneous catalyst.

However, HILLION teaches in the first paragraph of the description a process for the manufacture of a fatty acid ester by the use of a **heterogeneous catalyst chosen from zinc oxide, a mixture of zinc oxide and alumina or a zinc aluminate consistent with the formula: $ZnAl_2O4$, xZnO, y AL_2O_3 (x, y= 0-2),** with a 1-18C mono-alcohol.

It would be obvious to one of ordinary skill in the art to use the catalyst that HILLION as the transesterification catalyst in the process that BRADIN teaches.

The motivation to do so would be for the manufacture of a fatty acid ester to a high state of purity.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claims 17 and 18, DELGADO PUCHE teaches in paragraph 8 that the glycerine acetals mixed with methyl or ethyl esters of fatty acids in **biodiesel fuels.**

Regarding claim 10, DELGADO PUCHE teaches in paragraph 30 an example reacting **glycerine with acetone**. Glycerine reacts with acetone to form 2,2-dimethyl01,3,-dioxolane-4-methanol.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over DELGADO PUCHE (USPGPUB 2003/0167681) in view of English translation of HILLION (FR 2794768) in view of NAKAGUCHI (U.S. 3,714,202).

The above discussion of DELGADO PUCHE is incorporated herein by reference.

DELGADO PUCHE does not seem to explicitly state using an acid catalyst in the acetalization step.

However, NAKAGUCHI teaches in lines 22-25 of column 8 that acetal synthesis may be performed with an acid catalyst.

It would be obvious to one of ordinary skill in the art to use an acid catalyst in the acetalization step in the process that DELGADO PUCHE teaches.

The motivation to do so would be to speed up the reaction by use of a catalyst.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Allowable Subject Matter

13. Claims 5 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: Claims 5 and 22 recite heterogeneous catalysts that are not taught by the prior art of record.

Response to Arguments

15. Applicant's arguments, see page 1, filed 10/05/2010, with respect to claims 1-5, 6-8, and 16-20 rejected under 35 U.S.C. 103(a) as being unpatentable over DELGADO POUCJE (USPGPUB 2003/0167681) in view of English abstract of HILLION (FR 2855519) have been fully considered and are persuasive. The rejection of claims 1-5, 6-8, and 16-20 rejected under 35 U.S.C. 103(a) as being unpatentable over DELGADO POUCHE (USPGPUB 2003/0167681) in view of English abstract of HILLION (FR 2855519) has been withdrawn.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MING CHEUNG PO whose telephone number is (571)270-5552. The examiner can normally be reached on 9:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ming Cheung Po/
Patent Examiner
AU:1771

/Glenn A Caldarola/
Supervisory Patent Examiner, Art Unit 1771